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CLAIMS

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4   What is claimed is:

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6   1. An integrated circuit on a line card in a router, the line card having a first interface

7   through which the line card is couplable to either a cell network or a packet network,

8   the line card having a second interface through which the line card is coupled to a

9   switch fabric of the router, the integrated circuit being configurable:

10   in a first way such that the line card receives data in cell format from the cell

11   network via the first interface, the data passes through the integrated circuit, and the

12   line card outputs said data in cell format via the second interface to the switch fabric;

13   in a second way such that the line card receives data in packet format from the

14   packet network via the first interface, the data passes through the integrated circuit,

15   and the line card outputs said data in cell format via the second interface to the switch

16   fabric;

17   in a third way such that the line card receives data in cell format via the second

18   interface, the data passes through the integrated circuit, and the line card outputs said

19   data in cell format via the first interface to the cell network; and

20   in a fourth way such that the line card receives data in cell format via the second

21   interface, the data passes through the integrated circuit, and the line card outputs said

22   data in packet format via the first interface to the packet network.

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24   2. The integrated circuit of Claim 1, wherein the data in the cell format represents

25   first data contained within cells of a fixed size when the first data belongs to a first

26   flow, and wherein the data in the packet format represents second data contained in

27   variable size packets when the second data belongs to a second flow.

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29   3. The integrated circuit of Claim 1, wherein the router is one of an ATM switch that

30   redirects ATM cells from one network to another network.

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1   4. The integrated circuit of Claim 1, wherein the router is an IP router that redirects IP

2   packets from one network to another network.

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4   5. The integrated circuit of Claim 1, wherein both a first flow of cell format data and

5   a second flow of packet format data are received onto the line card via one

6   wavelength band in a fiber optic cable, the integrated circuit being configured in the

7   first way so the first flow of cell format data passes through the integrated circuit and

8   to the switch fabric, the integrated circuit being configured in the second way so that

9   the second flow of packet format data passes through the integrated circuit and to the

10   switch fabric.

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12   6. An integrated circuit on a line card in a router, the line card having a first interface

13   through which the line card is couplable to either a cell network or a packet network,

14   the line card having a second interface through which the line card is coupled to a

15   switch fabric of the router, the integrated circuit being configurable:

16   in a first way such that the line card receives data in cell format from the cell

17   network via the first interface, the data passes through the integrated circuit, and the

18   line card outputs said data in cell format via the second interface to the switch fabric;

19   and

20   in a second way such that the line card receives data in packet format from the

21   packet network via the first interface, the data passes through the integrated circuit,

22   and the line card outputs said data in cell format via the second interface to the switch

23   fabric.

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25   7. An integrated circuit on a line card in a router, the line card having a first interface

26   through which the line card is couplable to either a cell network or a packet network,

27   the line card having a second interface through which the line card is coupled to a

28   switch fabric of the router, the integrated circuit being configurable:

29   in a first way such that the line card receives data in cell format via the second

30   interface, the data passes through the integrated circuit, and the line card outputs said

31   data in cell format via the first interface to the cell network; and

1   in a second way such that the line card receives data in cell format via the second

2   interface, the data passes through the integrated circuit, and the line card outputs said

3   data in packet format via the first interface to the packet network.

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5   8. An integrated circuit on a line card in a router, the line card having a first interface

6   through which the line card is couplable to either a cell network or a packet network,

7   the line card having a second interface through which the line card is coupled to a

8   switch fabric of the router, the integrated circuit being configurable:

9   in a first way such that the line card receives data in cell format from the cell

10   network via the first interface, the data passes through the integrated circuit, and the

11   line card outputs said data in packet format via the second interface to the switch

12   fabric;

13   in a second way such that the line card receives data in packet format from the

14   packet network via the first interface, the data passes through the integrated circuit,

15   and the line card outputs said data in packet format via the second interface to the

16   switch fabric;

17   in a third way such that the line card receives data in packet format via the second

18   interface, the data passes through the integrated circuit, and the line card outputs said

19   data in cell format via the first interface to the cell network; and

20   in a fourth way such that the line card receives data in packet format via the

21   second interface, the data passes through the integrated circuit, and the line card

22   outputs said data in packet format via the first interface to the packet network.

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24   9. An integrated circuit on a line card in a router, the line card having a first interface

25   through which the line card is couplable to either a cell network or a packet network,

26   the line card having a second interface through which the line card is coupled to a

27   switch fabric of the router, the integrated circuit being configurable:

28   in a first way such that the line card receives data in cell format from the cell

29   network via the first interface, the data passes through the integrated circuit, and the

30   line card outputs said data in packet format via the second interface to the switch

31   fabric; and

1 in a second way such that the line card receives data in packet format from the

2 packet network via the first interface, the data passes through the integrated circuit,

3 and the line card outputs said data in packet format via the second interface to the

4 switch fabric.

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6 10. An integrated circuit on a line card in a router, the line card having a first

7 interface through which the line card is couplable to either a cell network or a packet

8 network, the line card having a second interface through which the line card is

9 coupled to a switch fabric of the router, the integrated circuit being configurable:

10 in a first way such that the line card receives data in packet format via the second

11 interface, the data passes through the integrated circuit, and the line card outputs said

12 data in cell format via the first interface to the cell network; and

13 in a second way such that the line card receives data in packet format via the

14 second interface, the data passes through the integrated circuit, and the line card

15 outputs said data in packet format via the first interface to the packet network.

16

17 11. An integrated circuit on a line card in a router, the integrated circuit comprising a

18 lookup engine, a segmentation engine, and a reassembly engine, the lookup engine

19 being usable to analyze a flow of incoming network information and to output an

20 identifying flow number therefore, the segmentation engine being usable to segment a

21 large block of data into a plurality of smaller blocks of data, the segmentation engine

22 temporarily storing the smaller blocks of data, the reassembly engine being usable to

23 reassemble a plurality of smaller blocks of data into a larger block of data, wherein

24 the integrated circuit is configurable:

25 in a first configuration as an ingress integrated circuit to receive data in cell

26 format and to output to a switch fabric of the router said data in packet format;

27 in a second configuration as an ingress integrated circuit to receive data in packet

28 format and to output to the switch fabric of the router said data in packet format;

29 in a third configuration as an egress integrated circuit to receive data in packet

30 format from the switch fabric of the router and to output to a cell network said data in

31 cell format; and

in a fourth configuration as an egress integrated circuit to receive data in packet

format from the switch fabric of the router and to output to a packet network said data

in packet format.

12. The integrated circuit of Claim 11, wherein the lookup engine operates to output flow numbers in the first configuration and the second configuration but does not output flow numbers in the third configuration and the fourth configuration.

13. The integrated circuit of Claim 11, wherein the segmentation engine operates to segment a large block of data into a plurality of smaller blocks of data second configuration, the third configuration, and the fourth configuration, the segmentation engine not segmenting a large block of data into a plurality of smaller blocks in the first configuration.

14. The integrated circuit of Claim 11, wherein the reassembly engine operates to reassemble a plurality of smaller blocks of data into a larger block of data in the first configuration, the second configuration, and the fourth configuration, the reassembly engine not reassembling a plurality of smaller blocks of data into a large block of data in the third configuration.

15. The integrated circuit of Claim 11, wherein the lookup engine is usable to output identifying flow numbers for ATM flows.

16. The integrated circuit of Claim 11, wherein the lookup engine is usable to output identifying flow numbers for MPLS flows.

17. The integrated circuit of Claim 11, wherein the lookup engine is usable to output identifying flow numbers for frame relay flows.

18. The integrated circuit of Claim 11, wherein the integrated circuit has a first interface through which the integrated circuit is coupled to a network, the first

interface having a plurality of logical ports such that each flow is received onto or is
transmitted from the integrated circuit via one and only one port, the flows on each
port being of only one service type.

19. The integrated circuit of Claim 18, wherein the lookup engine being usable to
analyze flows of incoming network information by identifying a port for a flow and
then based on the port identified looking up the service type of the flow.

20. The integrated circuit of Claim 11, wherein the each of the smaller blocks of data
generated by the segmentation engine is temporarily stored in a memory and wherein
a pointer is generated for each smaller block of data that identifies where in the
memory the smaller block of data is located, and wherein the reassembly engine does
not read the smaller blocks of data out of the memory and reassemble them and then
store them in reassembled format prior to the smaller blocks being output from the
integrated circuit but rather the smaller blocks of data are output from the integrated
circuit smaller block by smaller block, the pointers being used to identify where in
memory each smaller block being output is located.

21. The integrated circuit of Claim 1, wherein the integrated circuit further comprises
a per flow queue, a scheduler, and a memory manager.